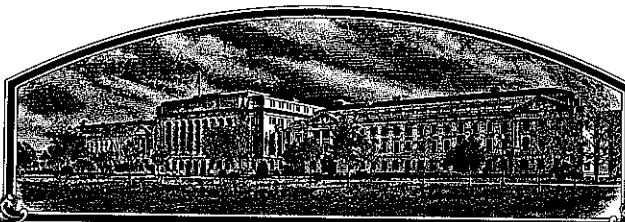


No.

8900037



THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME;

NBSU Research Foundation

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED NOVEL VARIETY OF SEXUALLY REPRODUCED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF *eighteen* YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, OR IMPORTING IT, OR EXPORTING IT, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT. UNITED STATES SEED OF THIS VARIETY (1) SHALL BE SOLD BY VARIETY NAME ONLY AS OF CERTIFIED SEED AND (2) SHALL CONFORM TO THE NUMBER OF GENERATIONS BY THE OWNER OF THE RIGHTS. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

WHEAT

'2370'

In Testimony Whereof, I have hereunto set my hand and caused the seal of the Plant Variety Protection Office to be affixed at the City of Washington, D.C. this 28th day of May in the year of our Lord one thousand nine hundred and ninety-three.

Attest:

Kenneth Evans
Commissioner

Plant Variety Protection Office
Agricultural Marketing Service

Mike Egan
Secretary of Agriculture

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE

FORM APPROVED: OMB NO. 0581-0055

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

(Instructions on reverse)

1. NAME OF APPLICANT(S) NDSU RESEARCH FOUNDATION Pioneer Hi-Bred International, Inc. Plant Breeding Division Dept. of Cereal Seed Breeding		2. TEMPORARY DESIGNATION XW361	3. VARIETY NAME 2370
4. ADDRESS (Street and No. or R.F.D. No., City, State, and Zip Code) 7301 NW 62nd Ave., PO Box 85 5014 Johnston, IA 50131-0085 FARGO, ND 58105		5. PHONE (Include area code) (701) 237-7654 (515) 270-3300 Ext. 3311	FOR OFFICIAL USE ONLY VPPO NUMBER 89000037
6. GENUS AND SPECIES NAME Triticum aestivum L.	7. FAMILY NAME (Botanical) Graminae		FILING DATE <u>Dec. 2, 1988</u> TIME <u>1:30</u> <input type="checkbox"/> A.M. <input checked="" type="checkbox"/> P.M.
8. KIND NAME Wheat	9. DATE OF DETERMINATION October 1985		AMOUNT FOR FILING \$ <u>Dec. 2, 1988</u> DATE <u>\$ 1800.00</u>
10. IF THE APPLICANT NAMED IS NOT A "PERSON," GIVE FORM OF ORGANIZATION (Corporation, partnership, association, etc.) Corporation			AMOUNT FOR CERTIFICATE \$ <u>200.00</u> DATE <u>April 30, 1993</u>
11. IF INCORPORATED, GIVE STATE OF INCORPORATION Iowa			12. DATE OF INCORPORATION
13. NAME AND ADDRESS OF APPLICANT REPRESENTATIVE(S), IF ANY, TO SERVE IN THIS APPLICATION AND RECEIVE ALL PAPERS Dr. Mark Iwig DR. H. R. LUND Pioneer Hi-Bred International, Inc. NORTH DAKOTA AGRICULTURAL EXPERIMENT STATION 7301 NW 62nd Ave., PO Box 85 P.O. Box 5435 Johnston, IA 50131-0085 FARGO, ND 58105 (515) 270-3300 Ext. 3311 PHONE (Include area code): (701) 237-7654			
14. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED			
a. <input checked="" type="checkbox"/> Exhibit A, Origin and Breeding History of the Variety (See Section 52 of the Plant Variety Protection Act.)			
b. <input checked="" type="checkbox"/> Exhibit B, Novelty Statement.			
c. <input checked="" type="checkbox"/> Exhibit C, Objective Description of Variety (Request form from Plant Variety Protection Office.)			
d. <input checked="" type="checkbox"/> Exhibit D, Additional Description of Variety.			
e. <input checked="" type="checkbox"/> Exhibit E, Statement of the Basis of Applicant's Ownership.			
15. DOES THE APPLICANT(S) SPECIFY THAT SEED OF THIS VARIETY BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED? (See Section 83(a) of the Plant Variety Protection Act.) <input checked="" type="checkbox"/> Yes (If "Yes," answer items 16 and 17 below) <input checked="" type="checkbox"/> No			
16. DOES THE APPLICANT(S) SPECIFY THAT THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		17. IF "YES" TO ITEM 16, WHICH CLASSES OF PRODUCTION BEYOND BREEDER SEED? <input checked="" type="checkbox"/> Foundation <input type="checkbox"/> Registered <input checked="" type="checkbox"/> Certified	
18. DID THE APPLICANT(S) PREVIOUSLY FILE FOR PROTECTION OF THE VARIETY IN THE U.S. <input type="checkbox"/> Yes (If "Yes," give date) <input checked="" type="checkbox"/> No			
19. HAS THE VARIETY BEEN RELEASED, OFFERED FOR SALE, OR MARKETING IN THE U.S. OR OTHER COUNTRIES? <input type="checkbox"/> Yes (If "Yes," give names of countries and dates) <input checked="" type="checkbox"/> No			
20. The applicant(s) declare(s) that a viable sample of basic seeds of this variety will be furnished with the application and will be replenished upon request in accordance with such regulations as may be applicable. The undersigned applicant(s) is (are) the owner(s) of this sexually reproduced novel plant variety, and believe(s) that the variety is distinct, uniform, and stable as required in Section 41, and is entitled to protection under the provisions of Section 42 of the Plant Variety Protection Act. Applicant(s) is (are) informed that false representation herein can jeopardize protection and result in penalties.			
SIGNATURE OF APPLICANT Mark M. Iwig		DATE 11/22/88	
SIGNATURE OF APPLICANT		DATE	

North Dakota State University
P.O. Box 5051
University Station
Fargo, North Dakota
58105-5051

March 24, 1993

Tel. 701.237.7971
Fax 701.237.7973

Mr. Alan A. Atchley
Plant Variety Protection Office
NAL Building, Room 500
10301 Baltimore Blvd.
Beltsville, MD 20705

SUBJECT: PV Application No. 8900037, WHEAT variety '2370'

Dear Mr. Atchley:

Following is the corrected information that you requested for application materials for 2370:

- Exhibit A - These traits have been observed for three generations for stability and uniformity.
- Exhibit C, Item 9 - Auricles, hairiness is absent.
- Exhibit D - Auricles are glabrous, hairiness is absent, and no...

This is the information requested in a letter (October 7, 1992) to H. R. Lund.

Sincerely,



Richard C. Frohberg
Professor

cc: Dr. Foster

EXHIBIT A. ORIGIN AND BREEDING HISTORY OF PIONEER VARIETY 2370
HARD RED SPRING WHEAT

Pioneer variety 2370 was developed by Pioneer Hi-Bred International, Inc., Plant Breeding Division, Glyndon Cereal Seed Research Station, Route #1 Box 128A, Glyndon, MN 56547.

The abbreviated parentage of 2370 is SGY043/W6718. SGY043 is a white seeded spring wheat germplasm line of unknown pedigree. W6718 is a Pioneer developed line with the pedigree TZPP/Sonora 64//Crim/2/Red River 68.

The procedure used to develop 2370 from the time of the final cross was as follows:

- 1980 - F1 generation: grown at Glyndon, MN. The cross was given the experimental number SBZ481.
 - 1980-81 - F2 generation: single heads selected at Yuma, AZ.
 - 1981 - F3 generation: headrows from Yuma single head selections were planted at Glyndon. Single head selections were taken from selected rows.
 - 1981-82 - F4 generation: single head selections from each selected row were grown at Yuma. Individual rows were selected and cut separately in bulk.
 - 1982 - F5 generation: selected bulk rows from Yuma were grown in a screening yield test at Glyndon. The selection was given the experimental number SBZ481E.
 - 1983 - F6 generation: planted at Glyndon and four off-station testing locations in preliminary yield tests. Single heads were picked for purification. Quality analysis was conducted at the Pioneer quality lab in Hutchinson, KS.
 - 1983-84 - F7 generation: single heads from Glyndon were grown at Yuma. Off-type rows were discarded and the remainder were cut as single row bulks and sent to Glyndon.
 - 1984 - F7 generation: grown in an advanced variety test at Glyndon and seven off-station testing locations. Quality analysis was conducted at the Pioneer quality lab in Hutchinson, KS.
- F8 generation: single row purity bulks from Yuma were planted in individual plots at Glyndon. Off-type plots were discarded. Two plots were selected for advance and the remaining plots were bulked together. Heads were picked from the two selected plots for further purification.
- 1984-85 - F9 generation: heads from the selected plots at Glyndon were grown at Yuma. Off-type rows were discarded. The remaining rows of each selection were cut as individual bulks and sent to Glyndon.

- 1985 - F9 generation: was grown in the elite variety test for the first year at Glyndon, and 14 off-station sites using the 1984 Glyndon purification seed source. A separate experiment containing the two individual selections were grown at two locations. Based on electrophoretic assay for purity and results of this test, one selection was chosen to advance. Quality evaluations were done at the Pioneer quality lab and at the North Dakota State University quality lab in the Dept. of Cereal Chemistry and Food Technology.
- F10 generation: progeny plots from the Yuma single row purity bulks of each selection were grown at Glyndon. Off-type plots were discarded and the remaining plots bulked together.
- 1986 - F11 generation: was grown in the elite variety test for the second year at 16 locations using the purified seed source. Quality evaluations were done at the Pioneer quality lab and at the NDSU quality lab. A .25 acre breeders increase was also grown.
- 1987 - F12 generation: was grown in the elite variety test at 16 locations for the third year. An 8 acre breeders seed increase was also grown. Quality evaluations were again done at the Pioneer quality lab and at the NDSU quality lab.
- 1988 - F13 generation: was grown at 10 locations for the fourth year of elite variety trial testing. Quality analysis was again conducted at the Pioneer quality lab and at the NDSU quality lab. One hundred fifty one (151) acres of 2370 were grown as a parent seed increase near Moorhead, MN. The commercial number 2370 was assigned with the sale of commercial seed projected for the fall of 1989 for planting in the spring of 1990.

2370 has shown good uniformity and stability for all traits as described in Exhibit C. It is moderately insensitive to short photoperiods (Table 4).

Breeder seed is being maintained at the Glyndon Cereal Seed Research Station.

EXHIBIT B. NOVELTY STATEMENT

8900037

Exhibits C and D provide information that should aid in identifying Pioneer variety 2370. 2370 most closely resembles the variety Len. The following characters would clearly differentiate 2370 from Len.

1. 2370 is 2.4 days earlier heading than Len and 2.5 days earlier in physiologic maturity than Len, on the average.
2. 2370 is moderately insensitive to photoperiod, while Len is photoperiod sensitive.
3. The seed shape of 2370 more closely resembles a typical winter wheat kernel while Len has a typical spring wheat kernel.
4. Len has about .7% higher grain protein than 2370, on the average.
5. 2370 is a shorter and weaker mixer than Len with a mix time of 3.9 vs 4.5 for Len and a mixing tolerance of 3.9 vs 5.9 for Len.

2370 has shown uniformity and stability for all traits described in Exhibit C (Form GR470-6), "Objective Description of Variety". Taller variants may occur at a frequency of about 1 in 20,000 plants and some awnless variants may occur at a frequency of about 1 in 20,000 plants.

OBJECTIVE DESCRIPTION OF VARIETY
WHEAT (TRITICUM SPP.)

INSTRUCTIONS: See Reverse.

NAME OF APPLICANT(S)

Pioneer Hi-Bred International, Inc.

ADDRESS (Street and No. or R.F.D. No., City, State, and ZIP Code)

Plant Breeding Division

7301 N.W. 62nd Ave., P.O. Box 85

Johnston, IA 50131

FOR OFFICIAL USE ONLY

PVPO NUMBER

8900037

VARIETY NAME OR TEMPORARY
DESIGNATION

2370

Place the appropriate number that describes the varietal character of this variety in the boxes below.
Place a zero in first box (e.g. or) when number is either 99 or less or 9 or less.

1. KIND:

 1 = COMMON 2 = DURUM 3 = EMMER 4 = SPELT 5 = POLISH 6 = POULARD 7 = CLUB

2. TYPE:

 1 = SPRING 2 = WINTER 3 = OTHER (Specify) 1 = SOFT 2 = HARD 3 = OTHER (Specify) 1 = WHITE 2 = RED 3 = OTHER (Specify)

3. SEASON - NUMBER OF DAYS FROM EMERGENCE TO:

 FIRST FLOWERING LAST FLOWERING

4. MATURITY (50% Flowering):

 NO. OF DAYS EARLIER THAN 1 = ARTHUR 2 = SCOUT 3 = CHRIS
 NO. OF DAYS LATER THAN 4 = LEMHI 5 = NUGAINES 6 = LEEDS

5. PLANT HEIGHT (From soil level to top of head):

 CM. HIGH
 CM. TALLER THAN 1 = ARTHUR 2 = SCOUT 3 = CHRIS
 CM. SHORTER THAN 4 = LEMHI 5 = NUGAINES 6 = LEEDS

6. PLANT COLOR AT BOOTING (See reverse):

 1 = YELLOW GREEN 2 = GREEN 3 = BLUE GREEN

7. ANTHUR COLOR:

 1 = YELLOW 2 = PURPLE

8. STEM:

 Anthocyanin: 1 = ABSENT 2 = PRESENT Waxy bloom: 1 = ABSENT 2 = PRESENT Hairiness of last internode of rachis: 1 = ABSENT 2 = PRESENT Internodes: 1 = HOLLOW 2 = SOLID NO. OF NODES (Originating from node above ground) CM. INTERNODE LENGTH BETWEEN FLAG LEAF AND LEAF BELOW

9. AURICLES:

 Anthocyanin: 1 = ABSENT 2 = PRESENT Hairiness: 1 = ABSENT 2 = PRESENT

10. LEAF:

 Flag leaf at booting stage: 1 = ERECT 2 = RECURVED
3 = OTHER (Specify): Flag leaf: 1 = NOT TWISTED 2 = TWISTED Hairs of first leaf sheath: 1 = ABSENT 2 = PRESENT Waxy bloom of flag leaf sheath: 1 = ABSENT 2 = PRESENT MM. LEAF WIDTH (First leaf below flag leaf) CM. LEAF LENGTH (First leaf below flag leaf)

11. HEAD:

☐ 2 Density: 1 = LAX 2 = DENSE

☐ 4 Shape: 1 = TAPERING 2 = STRAP 3 = CLAVATE
4 = OTHER (Specify) oblong
☐ 4 Awnedness: 1 = AWNLESS 2 = APICALLY AWNLETED 3 = AWNLETED 4 = AWNED

☐ 2 Color at maturity: 1 = WHITE 2 = YELLOW 3 = PINK 4 = RED
5 = BROWN 6 = BLACK 7 = OTHER (Specify) _____

☐ 0 ☐ 8 CM. LENGTH

☐ 1 ☐ 2 MM. WIDTH

12. GLUMES AT MATURITY:

☐ 2 Length: 1 = SHORT (CA. 7 mm.) 2 = MEDIUM (CA. 8 mm.)
3 = LONG (CA. 9 mm.)

☐ 3 Width: 1 = NARROW (CA. 3 mm.) 2 = MEDIUM (CA. 3.5 mm.)
3 = WIDE (CA. 4 mm.)

☐ 3 Shoulder shape: 1 = WANTING 2 = OBLIQUE 3 = ROUNDED
4 = SQUARE 5 = ELEVATED 6 = APICULATE

☐ 3 Beak: 1 = OBTUSE 2 = ACUTE 3 = ACUMINATE

13. COLEOPTILE COLOR:

☐ 1 1 = WHITE 2 = RED 3 = PURPLE

14. SEEDLING ANTHOCYANIN:

☐ 1 1 = ABSENT 2 = PRESENT

15. JUVENILE PLANT GROWTH HABIT:

☐ 3 1 = PROSTRATE 2 = SEMI-ERECT 3 = ERECT

16. SEED:

☐ 1 Shape: 1 = OVATE 2 = OVAL 3 = ELLIPTICAL

☐ 1 Cheek: 1 = ROUNDED 2 = ANGULAR

☐ 2 Brush: 1 = SHORT 2 = MEDIUM 3 = LONG

☐ 1 Brush: 1 = NOT COLLARED 2 = COLLARED

☐ 3 Phenol reaction (See instructions): 1 = IVORY 2 = FAWN 3 = LT. BROWN
4 = BROWN 5 = BLACK

☐ 3 Color: 1 = WHITE 2 = AMBER 3 = RED 4 = PURPLE 5 = OTHER (Specify) _____

☐ 0 ☐ 7 MM. LENGTH

☐ 0 ☐ 4 MM. WIDTH

☐ 3 ☐ 3 GM. PER 1000 SEEDS

17. SEED CREASE:

☐ 2 Width: 1 = 60% OR LESS OF KERNEL 'WINOKA'
2 = 80% OR LESS OF KERNEL 'CHRIS'
3 = NEARLY AS WIDE AS KERNEL 'LEMHI'

☐ 2 Depth: 1 = 20% OR LESS OF KERNEL 'SCOUT'
2 = 35% OR LESS OF KERNEL 'CHRIS'
3 = 50% OR LESS OF KERNEL 'LEMHI'

18. DISEASE: (0 = Not Tested, 1 = Susceptible, 2 = Resistant)

☐ 2 STEM RUST (Races) Local
☐ 2 LEAF RUST (Races) Local
☐ 0 STRIPE RUST (Races) _____

☐ 0 LOOSE SMUT

☐ 0 POWDERY MILDEW

☐ 0 BUNT

☐ 1 OTHER (Specify) Leaf Blight Complex (MS)

19. INSECT: (0 = Not Tested, 1 = Susceptible, 2 = Resistant)

☐ 0 SAWFLY

☐ 0 APHID (Bydv.)

☐ 0 GREEN BUG

☐ 0 CEREAL LEAF BEETLE

☐ 0 OTHER (Specify) _____

 HESSIAN FLY
RACES:

☐ 1 GP

☐ A

☐ B

☐ C

☐ D

☐ E

☐ F

☐ G

20. INDICATE WHICH VARIETY MOST CLOSELY RESEMBLES THAT SUBMITTED:

CHARACTER	NAME OF VARIETY	CHARACTER	NAME OF VARIETY
Plant tillering	2385	Seed size	2385
Leaf size	Len	Seed shape	Red River 68
Leaf color	Waldron	Coleoptile elongation	2369
Leaf carriage	Len	Seedling pigmentation	2369

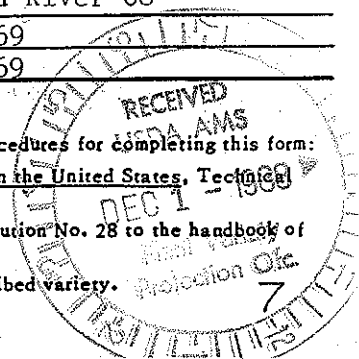
INSTRUCTIONS

GENERAL: The following publications may be used as a reference aid for the standardization of terms and procedures for completing this form:

(a) L.W. Briggie and L. P. Reitz, 1963, Classification of Triticum Species and Wheat Varieties Grown in the United States, Technical Bulletin 1278, United States Department of Agriculture.

(b) W.E. Walls, 1965, A Standardized Phenol Method for Testing Wheat Seeds for Varietal Purity, contribution No. 28 to the handbook of seed testing prepared by the Association of Official Seed Analysts. (See attachment.)

LEAF COLOR: Nickerson's or any recognized color fan should be used to determine the leaf color of the described variety.



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Table 1. Agronomic performance of 2370 and standard varieties in elite yield tests for 56 location years during the period 1985-1988.

Variety	Days To 50% Head*	Days To Maturity*	Height (cm)	Lodging Score +	Yield (bu/ac)	Test Wt. (lbs/bu)	Harvest Moist. (%)
2370	64.2	96.3	78.6	7.7	61.8	58.4	13.6
2369	65.7	97.4	77.4	7.0	59.2	58.0	14.2
Marshall	67.4	98.6	74.8	7.7	61.6	56.2	14.9
Len	66.6	98.8	80.2	7.5	54.5	56.4	14.5

* Number of days from planting to 50% heading and physiologic maturity.

+ Scale of 1-9; 1 = poor, 9 = excellent.

Table 2. Disease response of 2370 and standard varieties in elite yield tests for 56 location years during the period 1985-1988.

Variety	Leaf Rust	Stem Rust	Leaf Blight+
2370	R-MR	R	4.2
2369	MS	R	5.3
Marshall	MR-MS	R	5.4
Len	R-MR	R	5.1

* Number of days from planting to 50% heading and physiologic maturity.

+ Scale of 1-9; 1 = poor, 9 = excellent.

8900037

Table 3. Results of quality testing of 2370 by Pioneer Quality Laboratory 1985-1988.

Variety	TKW (grams)	Grain Protein (%)	Flour Protein (%)	Flour Yield (%)	Water Abs. (%)	Loaf Volume (cc)	Mix* Time	Mixing * Tolerance
2370	33.1	15.5	15.0	70.5	64.4	76.2	3.9	3.9
2369	31.6	15.2	13.8	70.4	63.4	74.0	5.1	7.8
Marshall	29.6	14.7	13.9	71.2	62.7	75.0	3.0	2.1
Len	32.2	16.2	14.7	70.5	64.5	80.1	4.5	5.9
Reps	59	60	15	15	12	12	15	15

Data are averages of 1985 through 1988.

* Mix time and mixing tolerance were determined with a mixograph.

Time = minutes; tolerance = scale of 1-9 where 3-7 is satisfactory.

8900037

Table 4. Photoperiod response of 2370 and standard hard red spring wheat varieties based on the effects of a five-hour night interruption by a field lighting system at Yuma, Arizona, 1986-1988.

Variety	Delay (Days) Due To Absence Of Lights*		Classification
	50% Heading	Phys. Maturity	
2370	6.0	4.7	moderately insensitive
2369	5.0	4.0	moderately insensitive
Marshall	21.3	11.3	sensitive
Len	19.7	11.7	sensitive
Stoa	21.0	14.3	sensitive

* Night interruption commenced eight weeks after seeding.

- simulated "long day" = 5 hours of illumination 9:30 PM-2:30 AM
- short day = no lights, about a 12 hour normal day length

EXHIBIT D. ADDITIONAL DESCRIPTION OF PIONEER VARIETY 2370

Pioneer variety 2370 is a common Hard Red Spring Wheat, Triticum aestivum L.

Over the four year period 1985-88 at Glyndon, MN and off-station sites, 2370 averaged 1.3 days earlier heading and 1.1 days earlier in physiologic maturity than 2369, 3.2 days earlier heading and 2.3 days earlier in physiologic maturity than Marshall and 2.4 days earlier heading and 2.5 days earlier in physiologic maturity than Len.

2370 is a semi-dwarf variety with an average height of 79 cm, about 1 cm taller than 2369, 4 cm taller than Marshall and 2 cm shorter than Len.

At boot stage the plant color of 2370 is blue green and anthocyanin is absent from the stems. Waxy bloom is present on the stems at late boot stage. Anther color is yellow. Stem internodes are hollow. Auricles glabrous and no anthocyanin is present. Normally four nodes are present above ground and the internode length between the flag leaf and the leaf below averages 18 cm.

Leaves at boot stage are recurved and twisted. A waxy bloom is present. No pubescence is present on the first leaf sheath. The first leaf below the flag leaf averages 12 mm wide and 20 cm long.

Heads are dense, oblong, awned, yellow at maturity and average 8 cm long and 12 cm wide. Glumes at maturity are of medium length, wide width, the shoulders are rounded and the beak acuminate.

Coleoptile color is white and no seedling anthocyanin is present. Juvenile growth habit is erect.

Kernels are ovate in shape with rounded cheeks and a medium brush that is not collared. Seed color is light red. Seed averages 7 mm in length, 4 mm in width and has a 1000 kernel weight of about 33 grams. Phenol reaction is light brown.

2370 is resistant to the major races of stem rust and the local races of leaf rust. It has shown moderate susceptibility to the leaf blight complex diseases. 2370 has not been tested for loose smut, stripe rust, powdery mildew or bunt.

2370 is susceptible to the Great Plains race of Hessian fly. It has not been tested for sawfly, aphid, greenbug or cereal leaf beetle resistance but is assumed to be susceptible to all of these.

2370 has a good yield record when compared to the current commercial hard red spring wheats. Its best area of adaptation is eastern North Dakota and western Minnesota. It offers the advantages of high yield potential, early heading and maturity, good test weight, good leaf and stem rust resistance, good shatter resistance and very good straw strength.

2370 has satisfactory milling and baking properties. Grain protein level is higher than 2369 and Marshall, but lower than Len. Flour yield is similar to 2369 and Len and lower than Marshall. Mix time is shorter than 2369 and Len but is longer than Marshall. Mix tolerance is weaker than 2369 and Len but is stronger than Marshall. Loaf volume is higher than 2369 and Marshall but lower than Len. Water absorption is higher than 2369 and Marshall but similar to Len.

EXHIBIT E. STATEMENT OF THE BASIS OF APPLICANTS OWNERSHIP

Pioneer Hi-Bred International, Inc., Plant Breeding Division, believes it is the sole, original and first breeder of the 2370 variety of hard red spring wheat for which it solicits a certificate of protection.

WHEAT DONATION AGREEMENT

Agreement made this 17th day of July, 1990 between Pioneer Hi-Bred International, Inc., an Iowa Corporation, with offices at 700 Capital Square, 400 Locust Street, Des Moines, Iowa 50309, (Pioneer) and the NDSU Research Foundation, a North Dakota non-profit corporation, whose address is P. O. Box 5051, State University Station, Fargo, North Dakota 58105-5165 (the Foundation).

RECITALS

Whereas, Pioneer has decided to discontinue its research and development of hard red spring wheat varieties and the marketing and sale of such varieties in North America; and

Whereas, Pioneer desires to ensure the continued availability of said hard red spring wheat varieties and germplasm to the public; and

Whereas, the Foundation has the ability to maintain and develop said varieties and germplasm and to make them available to the public;

Now therefore the parties agree as follows:

I. GERMPLASM

A. Pioneer agrees to donate and assign to the Foundation, all of its right, title and interest including assignment of PVP certificates to the hard red spring wheat varieties listed below:

2369, 2375, 2370 and XW371

B. The donation shall include:

2369	Foundation:	478
	Registered:	14

2370	Breeder Seed:	12
	Foundation:	607
	Registered:	4362
	Head Row Pkts:	3300
	Plot Pkts	201

2375	Breeder Seed:	15
	Foundation:	1189
	Registered:	8170
	Head Row Pkts:	3000
	Plot Pkts:	209

XC371 Breeder Seed: 12
Foundation: 400
Head Row Pkts: 5000
Plot Pkts: 206

C. The Foundation understands and agrees that Pioneer® brand hard red spring wheat varieties will be made available for sale by Pioneer sales representatives through the 1990 sales season.

D. Pioneer agrees to donate to the Foundation all of its right, title, and interest except as restricted in Section II.A. below, to the following hard red spring germplasm lines:

Approximately 2300 F2 and F3 bulk populations;

Approximately 6500 F4, F5, and F6 selected lines;

Approximately 2700 lines of F7 and above generation with seed quantities adequate for yield testing.

including but not limited to seed stock, pedigree information, field books, quality and testing data,

II. RESTRICTIONS

A. The Foundation understands and agrees that the donation of the varieties and germplasm is restricted to development of varieties and sale of seed in North America only. The Foundation agrees to use its best efforts to prevent the distribution of the varieties and germplasm outside of North America.

B. The Foundation will not be permitted to use the name Pioneer® or any other registered trademark or service mark of Pioneer Hi-Bred International, Inc. in any manner whatsoever without the express written permission of Pioneer. The Foundation may use the variety numbers listed on the Plant Variety Protection certificates.

C. It is the hope and desire of Pioneer that the Foundation share the donated varieties and germplasm with other land grant institutions, specifically the University of Minnesota and South Dakota State University.

III. ANNOUNCEMENT AND EFFECTIVE DATE

A. The effective date of this Agreement shall be March 14, 1990.

IV. LIMITATION OF LIABILITY

A. Pioneer makes no warranty express or implied as to the yield, quality or tolerance to diseases, insects, or growing conditions of the varieties or the germplasm.

V. REPRESENTATIVES

A. All notices and correspondence shall be directed to the following representatives:

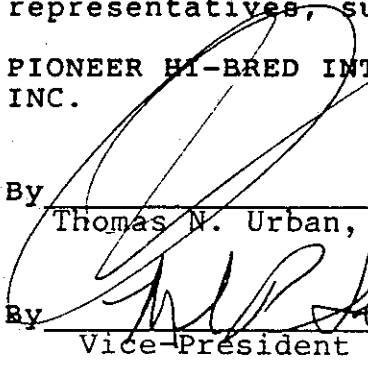
Pioneer: C. Sue Crum
Manager, Business Development
Pioneer Hi-Bred International, Inc.
317 6th Avenue, Suite 720
Des Moines, Iowa 50309

Foundation: Earl Foster, Chairperson
Crop and Weed Sciences Department
North Dakota State University
Box 5051 State University Station
Fargo, North Dakota 58105-5051

This Agreement constitutes the entire agreement and understanding between the parties and all previous discussions, representations, understandings or agreements are hereby merged in this Agreement.

This Agreement shall be binding upon the legal representatives, successors and assigns of the Parties.

PIONEER HI-BRED INTERNATIONAL,
INC.

By 
Thomas W. Urban, President

By 
Vice-President Research

NDSU RESEARCH FOUNDATION

By 
G.L. Ozbun, President

By 
H. R. Lund, Secretary

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